RESOLUTION ON SOLAR-RADIATION STATIONS AND RESULTS

(Submitted by Section of Meteorology)

WHEREAS, In view of the probable early completion of arrangements in southwest Africa for determining the constant of solar radiation and the availability thereafter of such data from three stations, one each in North America, South America and southwest Africa, and

WHEREAS, It is claimed that the provisional values of these determinations are an aid in weather forecasting; therefore, be it

Resolved, That the American Geophysical Union expresses its great pleasure and satisfaction in the purpose of the Smithsonian Institution and the National Geographic Society to maintain the stations above-mentioned for a period of at least four years; and, be it further

Resolved, That the Astrophysical Observatory of the Smithsonian Institution be, and hereby is, requested to make the data of these stations available at the earliest practicable moment to all organized weather services, and

Resolved, Further, that a copy of these resolutions be sent to the Secretary of the International Meteorological Committee (Th. Hesselberg, Oslo, Norway), for transmission to the various governmental weather services adhering to that Committee with a request for cooperation in the attempt to correlate data of solar radiation with terrestrial weather, and a copy also to the General Secretary of the International Geodetic and Geophysical Union (Colonel H. G. Lyons).

RESOLUTION ON GRAVITY AT SEA[1]

(Endorsed by sections of Geodesy and Seismology for favorable consideration)

WHEREAS, A method for the determination of gravity at sea with an accuracy comparable to that obtainable on land has been perfected by Dr. F. A. Vening Meinesz, of the Dutch Geodetic Commission, and has been successfully used by him on two voyages on a submarine, one from Holland to Java by way of the Suez Canal and the other from Holland to the Suez Canal, and the method will again be used by Dr. Meinesz during the present summer on a voyage from Holland to Java by way of the Panama Canal; and,

WHEREAS, The deficiency in gravity observations over the ocean areas and inland seas is retarding geological and geophysical studies; and,

WHEREAS, The desirability of making gravity observations at sea has been recognized by the Section of Geodesy of the International Geodetic and Geophysical Union which, by suitable resolutions, has urged all nations having navies to make observations similar to those made by Dr. Meinesz; therefore, be it

Resolved, That the Division of Geology and Geography of the National Research Council of the United States commends in the highest terms the Dutch Geodetic Commission and the Dutch Navy for making it possible for Dr. Meinesz to carry on his gravity observations at sea and expresses the hope that every maritime nation may find it possible to supplement the magnificent work of Dr. Meinesz by making additional gravity determinations at sea, especially near its own coasts. We especially commend this work to the Navy Department and to the Coast and Geodetic Survey of the United States of America; and, be it further

Resolved, That a copy of this resolution be sent to the President of the United States, to the Secretary of State, to Dr. F. A. Vening Meinesz, to Dr. J. J. A. Mueller, President of the Dutch Geodetic Commission, to the Admiral of the Dutch Navy, to the Secretary of the United States Navy, to the Secretary of Commerce, and to the Director of the United States Coast and Geodetic Survey.

[1] Adopted by Division of Geology and Geography at its annual meeting of April 24, 1926, and approved by Division of Foreign Relations of National Research Council on April 25, 1926.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A PRESERVING FLUID FOR GREEN PLANTS

No matter how highly the commercial preparation of laboratory specimens may be developed, there will always be botanists to whom the collection and preservation of their own material will have its own attraction. Most of the current methods, however, of preparing macroscopic—and, to some extent, microscopic—material leave much to be desired. Certainly the uniformly bleached condition of the preserved specimens offered for study in many botanical courses is not an incentive to interested work. As a possible solution of this problem the results of certain experiments begun last summer at the Marine Biological Laboratory and continued through the year at the University of Wisconsin are here tentatively offered for consideration.

The preparation of museum specimens of pathological plant material by the copper acetate method is not new. The process is, however, both tedious and unpleasant. In order to simplify it, it was necessary first to find a general fixing fluid fairly adequate for preserving most plant forms. With this as a basis of experimentation it was next important to find a way to color the plastids so that they should appear as natural as possible.

The fixing fluid finally employed is a modification of that used by the supply department of the Marine Biological Laboratory for preserving zoological specimens. As a coloring agent copper acetate was first used but proved too blue for all plants except the blue-green algae. Copper chloride gave somewhat better results, but it was not until uranium nitrate was employed with it that effects somewhat approximating natural conditions were finally obtained.

The complete formula is as follows:

50 per cent. alcohol	90 cc.
Commercial formalin	5 cc.
Glycerine	2.5 cc.
Glacial acetic acid	2.5 cc.
Copper chloride	10 gm.
Uranium nitrate	1.5 gm.

No particular care is necessary in making up this solution, as the salts dissolve fairly readily in the colorless fluid formed by the first four reagents. Incidentally, it may be mentioned that this colorless solution has been found useful in preserving several of the larger basidiomycetes, providing they were preserved fresh and carefully cleaned of adhering earth and other foreign materials. Other uses of this combination will undoubtedly suggest themselves. For the blue-green algae ten grams of copper acetate has been substituted for the copper chloride and uranium nitrate. Yellowish green plant forms permit of a reduction of the amount of copper chloride by half. This is particularly applicable to forms like Spirogyra, young corn plants, the young needle clusters of the larch and the like.

For general laboratory use materials are merely dropped into this fluid and stored until needed. Some delicate forms are ready for study in forty-eight hours. Generally speaking, however, the color change in most plants is less rapid, and from three to ten days are necessary for complete preservation. The gymnosperms do not readily yield to this treatment. The only success thus far obtained has been with very young and delicate needles.

Herbarium mounts made from forms preserved in this fluid have withstood fading, although exposed on a south window, for the last eight months and give evidence of continuing to hold their color.

Although some experiments have been made in that direction, no variation of this fluid has been found which will preserve the color of flowers for more than a very few days. The anthocyan pigments seem to be too unstable to produce satisfactory results.

Our present lack of definite knowledge as to the exact nature of chlorophyll prevents an adequate explanation of the process here described. From the behavior of specimens in this solution it may be supposed that there is possibly a reorganization of the chlorophyll molecule and the formation of copper and uranium derivatives in the chloroplasts.

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A BINOCULAR MAGNIFIER FOR THE DETERMINATION OF OPAQUE MINERALS

THE use of reflected light has found a definite place in the identification and genesis of opaque minerals, but so far as the writer can ascertain, determination is made with a petrographic or metallographic microscope. While this equipment is satisfactory for laboratory study, there are certain valid objections raised to its use by the man in the field.

The adjustment of the vertical illuminator requires considerable time and care, and such an adjustment must be made when the microscope is taken from its case for use, and when oblique illumination is desired. The polished surface of the specimen must be normal to the vertical light rays and if this condition is changed, as it frequently is during the washing and rubbing operations, the surface must again be made normal to the light rays. In addition, the field of vision is limited and on account of the short working distance, it is usually necessary to remove the specimen each time a reaction is completed and the operator frequently has difficulty in locating the exact spot for reexamination. If these conditions were remedied, considerable time could be saved during the determination.

The microchemical tests are by far the most important means of identification, yet these tests are often obscured because the drop of reagent stands with a distinctly convex surface. Only those light rays striking the central portion of the drop are reflected into the microscope tube, thus cutting down the observable area and obscuring the reaction.

Field instruments must be compact, portable and of sturdy construction. An additional important feature is simplicity of operation. Neither the petrographic nor the metallographic microscope fulfils these requirements and their use is therefore impractical for the man in the field.

A series of experiments with a binocular magnifier was conducted in an effort to find a practical method of obviating these difficulties. A Leitz binocular magnifier with a BSM-A type prism body, mounted on a sliding column, was used, which with 15x oculars gives a magnification of forty-five diameters. The binocular was clamped to the table and the specimen, mounted with its polished surface roughly horizontal to keep the reagents from running off, was placed on the table in front of it. In order to obtain the most brilliant illumination, the prism body was tilted until the light from the polished surface was reflected into the binocular tube. This feature eliminates any attachment for illumination.

In operation, it is not necessary to have the surface of the specimen exactly horizontal, as the specimen can be shifted and the prism body quickly tilted to receive the reflected rays of light from